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Maritimes Region

Canadian Science Advisory Secretariat
Science Response 2018/044

STOCK STATUS UPDATE OF AMERICAN LOBSTER IN LOBSTER FISHING AREA 34

Context

Advice on the stock status of American Lobster (Lobster) in Lobster Fishing Area (LFA) 34 is requested annually by Fisheries and Aquaculture Management (FAM). The last Regional Advisory Process of this stock occurred in February 2013 (DFO 2013, Tremblay et al. 2013), with updates occurring annually from 2014-2017 (DFO 2014, 2015, 2016, 2017). The 2013 assessment identified three primary indicators that describe changes in lobster abundance or biomass, as well as proposed reference levels for each indicator. The next framework review is planned for winter 2019. This Science Response updates these indicators to the end of the 2016-2017 fishing season.

This Science Response Report results from the Science Response Process on June 7, 2018, on the Stock Status Update of American Lobster in Lobster Fishing Area (LFA) 34.

Background

Description of the Fishery

Commercial lobster fishing in LFA 34 (Figure 1), off Southwest Nova Scotia, currently has the highest landings and the most participants of any LFA in Canada. Landings in LFA 34 began a long-term increase in the 1980s and recent landings are at record highs (Figure 2). Similar increases in landings, albeit not to the same magnitude, have occurred in many lobster stocks in the western Atlantic.

The fishery is managed by input controls including a minimum legal size (82.5 mm), prohibitions on landing of both egg-bearing and V-notched females, limited entry, a fixed season length (last Monday in November through to May 31st), and a trap limit. Other management measures include the requirement for escape vents to allow escapement of sublegal sizes and biodegradable trap mechanisms to mitigate ghost fishing by lost traps.

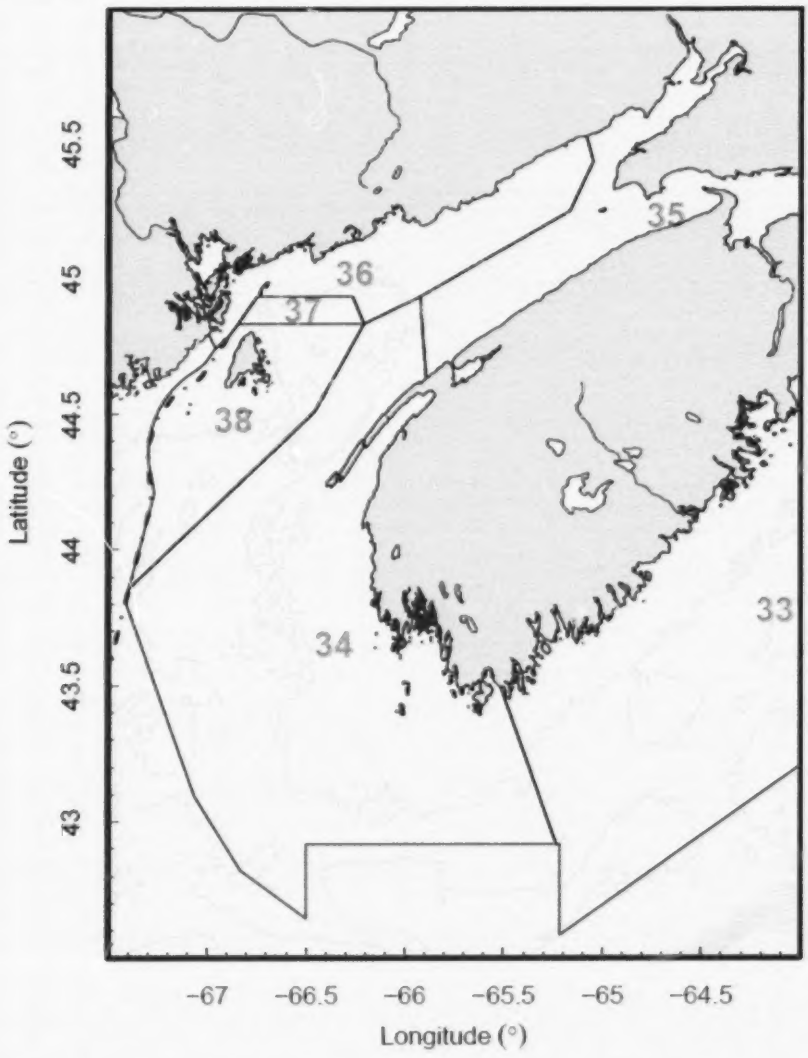

Figure 1. Spatial boundaries of Lobster Fishing Area (LFA) 34 and adjacent LFAs.

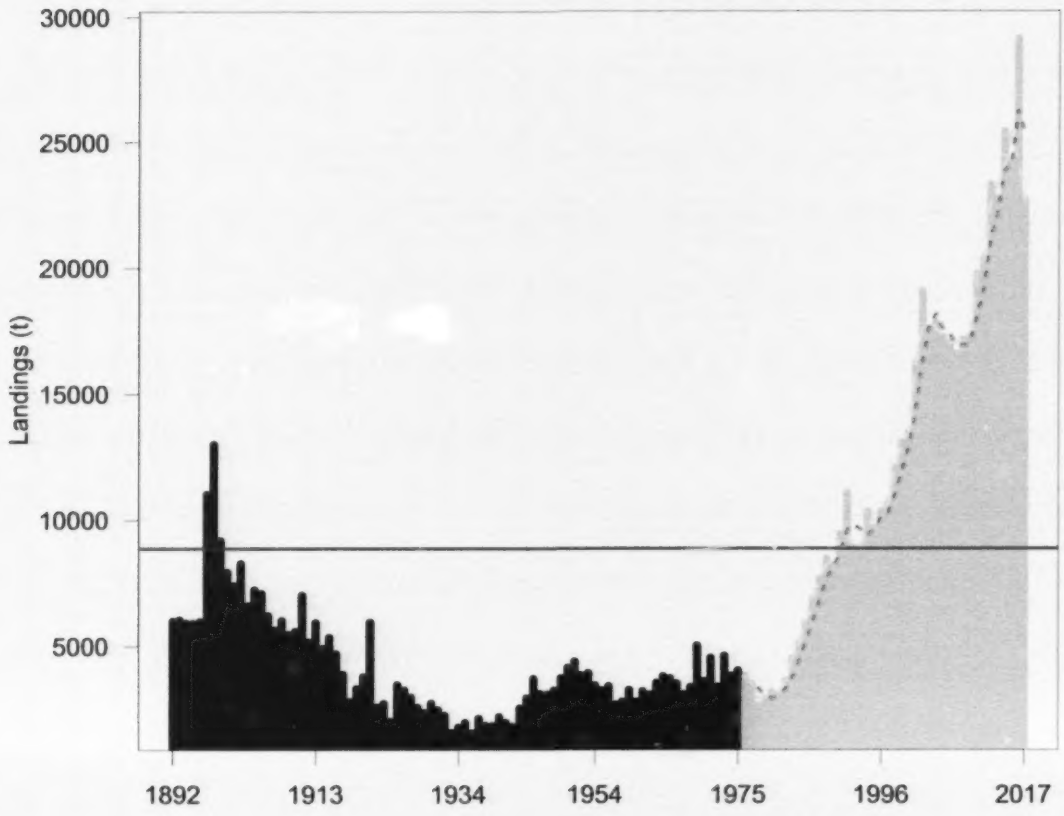

Figure 2. Annual lobster landings by the commercial fishery in LFA 34, 1892 to 1975 (black bars) and seasonal commercial landings (grey bars) from 1976 to 2017 (where 2017 represents the 2016-2017 season). The USR, defined as 80% of the median of landings in the period of 1985 to 2009 is 8,867 t, is shown as the horizontal blue line. The dotted red line is the 3-year running mean of landings. The dashed green line is the 3-year running median.

Analysis and Response

The 2013 LFA 34 assessment (DFO 2013, Tremblay et al. 2013) provided an analysis of stock health by describing fishery performance and providing indicators for abundance or biomass, fishing pressure and reproduction. Three primary indicators of abundance or biomass were identified and associated reference points were tabled. The first biomass indicator was based on landings. Landings-based reference points, both upper stock and limit reference points, are part of the current Inshore Lobster Integrated Fishery Management Plan for LFAs 27-38 and were documented at a Maritimes Region Science Advisory Meeting in 2012 (DFO 2012). Using landings as the sole indicator of biomass for lobster stocks has risks, and one of the goals of the 2013 assessment (DFO 2013) was to provide potential alternatives. Two additional indicators and associated Upper Stock Reference points (USR) and Limit Reference points (LRPs) were proposed and have subsequently been adopted. The first was based on commercial catch rate calculated as total landings per total trap hauls (TH) in LFA 34 with a USR of 0.62 kg/TH. The

second was based on the mean density of lobsters in the fishery-independent Inshore Lobster Trawl Survey (herein ILTS; formerly known as the "ITQ" survey) with a USR of 490 Lobsters/km^2. Previously lobster density was reported as lobsters per tow but is now reported as lobsters per km^2 by accounting for the swept area of each tow. For each indicator, a 3-year running mean of the index was used to compare to the USR. A 3-year running median is also shown because it is less sensitive to outliers. Currently, the 3-year running mean of each index is above the respective USR; thus, LFA 34 is considered to be in the Healthy Zone.

Landings

Landings for 2016-17 fishing season were 22,679 t. This is a 22% decrease from 2015-16, which at 29,151 t, were the highest on record (Figure 2). The USR for the biomass of legal lobsters based on landings (8,867 t) was defined as 80% of the median for the period 1984-85 to 2008-09. For the season ending 2016-17, the 3-year running mean landings was 25,325 t, which was above the USR.

Commercial Catch Rate

The commercial catch-per-unit-effort (CPUE, in kg/TH) has increased substantially since 1999-2000. The 2016-2017 value of 1.17 kg/trap haul is lower than the previous year, which was the highest on record. The USR for the biomass of legal size lobsters based on the CPUE (0.62 kg/TH) was defined as 80% of the median for the reference period 1998-1999 to 2008-09. The current 3-year running mean is 1.26 kg/TH, which is above the USR (Figure 3).

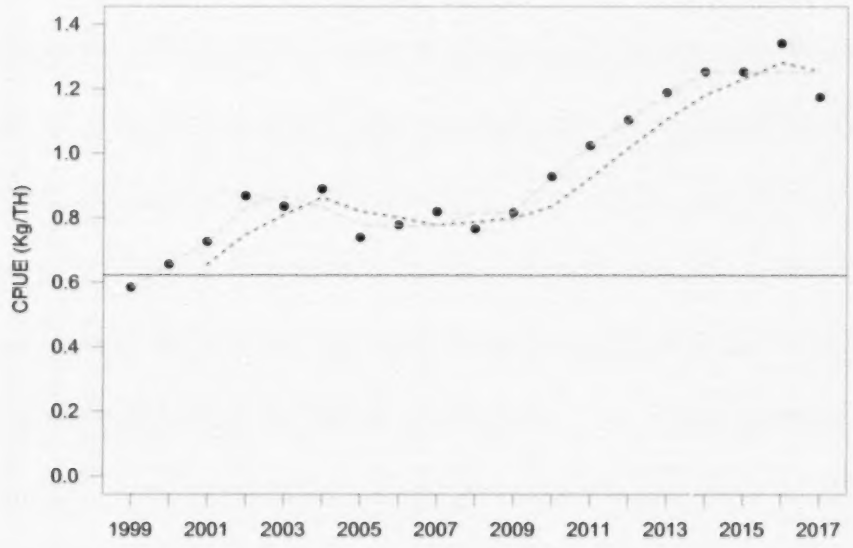

Figure 3. Trend in commercial CPUE (total weight landed (kg)/total TH) from reliable log records with the USR (blue horizontal line at 0.62 kg/TH). The USR is based on 80% of the median CPUE from 1998-1999 to 2008-2009. The dotted red line is the 3-year running mean (1.26 kg/trap haul after 2016-2017 season). The dashed green line is the 3-year running median.

Fishery-Independent Survey

The fishery independent indicator in the last assessment (DFO 2013) was based on the catch rate (number of lobsters/ km^2) from the stations in the Inshore Lobster Trawl Survey (ILTS) that had been completed in 16 of the last 21 years. The USR for total (legal and sublegal) lobster abundance based on this survey was 80% of the median catch rate for the period 1996-2009, which was 490 lobsters per km^2. Figure 4 shows that the 3-year running mean after the 2016 survey was above the USR. This survey was historically designed for other species but also sampled lobsters. In 2016 a change in the fishing gear was accompanied by gear comparison tows that will be used to develop conversion factors for the new net. The value presented for 2016 has been corrected from the previous update (DFO 2017), which did not account for the gear change. The value for 2017 has not been presented because correction factors for gear changes have not been developed or peer reviewed.

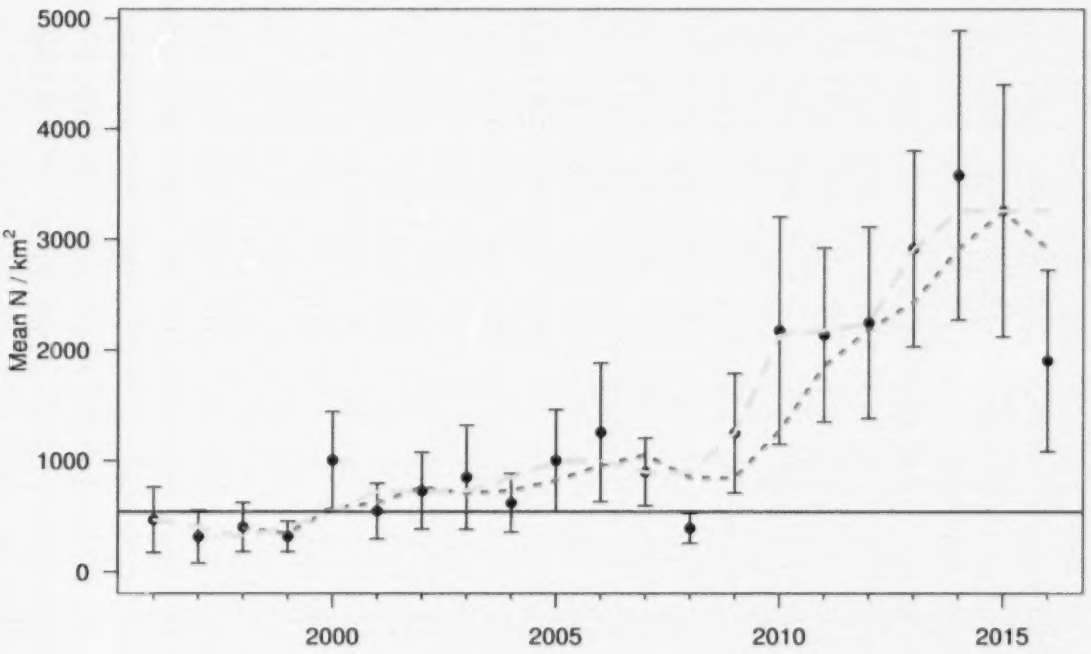

Figure 4. Trend in mean number of lobsters per standard tow from the Inshore Lobster Trawl Survey (ILTS; formerly ITQ) survey with a reduced number of stations (n=49) to adjust for changes to the survey in 2013. Standard error bars are shown for each year. An adjusted USR (blue horizontal line at 490 lobsters/km^2) was calculated by taking 80% of the median number per standard tow for the reduced number of stations. The red dotted line is the 3-year running mean. The dashed green line is the 3-year running median.

Conclusions

At the end of the 2016-2017 season (May 31, 2017), the lobster stock in LFA 34 was considered to be in the Healthy Zone. This is based on two indicators (landings, commercial catch rate) that were updated for 2017 and the trawl survey catch rate, which was corrected for 2016 but not updated for 2017. The 3-year running mean of each indicator was above the respective USRs.

Each of the indicators has strengths and weaknesses that were outlined in the previous assessment (DFO 2013). Given that all three are providing similar signals, there is confidence that the stock abundance and biomass remains high relative to the 1985-2009 period.

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Date: July 17, 2018

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This Report is Available from the

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ISSN 1919-3769
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Correct Citation for this Publication:

DFO. 2018. Stock Status Update of American Lobster (*Homarus americanus*) in Lobster Fishing Area 34. DFO Can. Sci. Advis. Sec. Sci. Resp. 2018/044.

Aussi disponible en français :

MPO. 2018. Mise à jour de l'état du stock de homard (Homarus americanus) dans la zone de pêche du homard 34. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2018/044.